

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A process for preparing adiponitrile ~~by hydrocyanating 1,3-butadiene over a catalyst, by,~~
~~— in a first process step, hydrocyanating 1,3-butadiene to 3-pentenitrile over at least one nickel(0) catalyst and,~~
~~— in a second process step, hydrocyanating 3-pentenitrile to adiponitrile over at least one nickel(0) catalyst with addition of at least one Lewis acid,~~
which comprises
transferring at least one of the nickel(0) catalysts used in the particular process comprising
the steps of
- (a) hydrocyanating 1,3-butadiene over at least one nickel(0) catalyst, resulting in a hydrocyanation stream 1 which comprises 3-pentenitrile, 2-pentenitrile, 2-methyl-2-butenitrile, C₉ nitriles, 2-methyl-3-butenitrile, methylglutaronitrile, the at least one nickel(0) catalyst, unconverted 1,3-butadiene and residues of unconverted hydrogen cyanide,
 - (b) removing the at least one nickel(0) catalyst from the hydrocyanation stream 1 to obtain a catalyst stream 1 which comprises the at least one nickel(0) catalyst, and a hydrocyanation stream 2 which comprises 3-pentenitrile, 2-pentenitrile, 2-methyl-2-butenitrile, C₉ nitriles and 2-methyl-3-butenitrile,
 - (c) regenerating the at least one nickel(0) catalyst in the catalyst stream 1 by reductive nickel catalyst synthesis with addition of fresh ligand to obtain a catalyst stream 2,
 - (d) hydrocyanating 3-pentenitrile over at least one nickel(0) catalyst and in the presence of at least one Lewis acid, the nickel(0) catalyst and the Lewis acid stemming from at least partly from catalyst stream 2, resulting in a hydrocyanation stream 3 which comprises the at least one nickel(0) catalyst, adiponitrile and the at least one Lewis acid,
 - (e) removing the at least one nickel(0) catalyst from the hydrocyanation stream 3 by extraction with an organic solvent to obtain a catalyst stream 3 which comprises the at least one nickel(0) catalyst, and a product stream which comprises adiponitrile,

and the catalyst stream 3 can be recycled at least partly into process step (a),
~~at least partly into the other process step in each case.~~

2. (Currently amended) ~~The process according to claim 1, characterized by~~ A process for preparing adiponitrile comprising the following process steps:

- (a) hydrocyanating 1,3-butadiene over at least one nickel(0) catalyst, resulting in a hydrocyanation stream 1 which comprises 3-pentenitrile, 2-pentenitrile, 2-methyl-2-butenitrile, C₉ nitriles, methylglutaronitrile, 2-methyl-3-butenitrile, the at least one nickel(0) catalyst, unconverted 1,3-butadiene and residues of unconverted hydrogen cyanide,
- (a') isomerizing 2-methyl-3-butenitrile which is present in the hydrocyanation stream 1 to 3-pentenitrile over at least one nickel(0) catalyst to obtain a 2-methyl-3-butenitrile-depleted and a 3-pentenitrile-enriched isomerization stream 1,
- (b) removing the at least one nickel(0) catalyst from the isomerization stream 1 to obtain a catalyst system 1 which comprises the at least one nickel(0) catalyst, and a hydrocyanation stream 2 which comprises 3-pentenitrile, 2-pentenitrile, 2-methyl-2-butenitrile, C₉ nitriles and 2-methyl-3-butenitrile,
- (c) regenerating the at least one nickel(0) catalyst in the catalyst stream 1 by reductive nickel catalyst synthesis with addition of fresh ligand to obtain a catalyst stream 2,
- (d) hydrocyanating 3-pentenitrile over at least one nickel(0) catalyst and in the presence of at least one Lewis acid, the nickel(0) catalyst and the Lewis acid stemming at least partly from catalyst stream 2, resulting in a hydrocyanation stream 3 which comprises adiponitrile, the at least one nickel(0) catalyst and the at least one Lewis acid,
- (e) removing the at least one nickel(0) catalyst from the hydrocyanation stream 2 by extraction with an organic solvent to obtain a catalyst stream 3 which comprises the at least one nickel(0) catalyst, and a product stream which comprises adiponitrile, and the catalyst stream 3 can be recycled at least partly into process step (a).

3. (Currently amended) The process according to claim 2, ~~wherein, in an additional~~ further comprising process step (f), in which the hydrocyanation stream 2 is separated and a 3-pentenitrile-rich stream 4 and a 2-methyl-3-butenitrile-rich stream 5 are obtained.

4. (Currently amended) The process according to claim 3, wherein the 3-pentenitrile-rich stream 4 is ~~conducted~~ directed into process step (d).

5. (Currently amended) The process according to claim 3 ~~or 4~~, wherein the 2-methyl-3-butenitrile-rich stream 5 is ~~conducted~~ directed into process step (a').

6. (Currently amended) The process according to ~~any of claims 1 to 5~~ claim 1, wherein the process sequence begins with process step (d) in the first run ~~when~~ so that fresh Lewis acid and fresh nickel(0) catalyst and/or reductively regenerated nickel(0) catalyst are used.

7. (Currently amended) The process according to ~~any of claims 1 to 6~~ claim 1, wherein 3-pentenitrile hydrocyanated in process step (d) ~~stems~~ comes from the hydrocyanation stream 1 ~~or the isomerization stream 1~~.

8. (Currently amended) The process according to ~~any of claims 1 to 7~~ claim 1, wherein only a portion of the catalyst stream 2 is used for the hydrocyanation in process step (d) and the remaining portion of the catalyst stream 2 is transferred directly into process step (e) ~~as a bypass stream 1~~.

9. (Currently amended) The process according to ~~any of claims 2 to 7~~ claim 2, wherein only a portion of the catalyst stream 2 is used for the hydrocyanation in process step (d) and the remaining portion of the catalyst stream 2 is transferred directly into process step (a') ~~as a bypass stream 1'~~.

10. (Currently amended) The process according to ~~any of claims 2 to 8~~ claim 2, wherein only a portion of the catalyst stream 3 is used for the hydrocyanation in process step (a) and the remaining portion of the catalyst stream 3 is transferred directly into process step (a') ~~as a bypass stream 2~~.

11. (Currently amended) The process according to ~~any of claims 1 to 10~~ claim 1, wherein a fresh and/or reductively regenerated nickel(0) catalyst is fed into process step (c).

12. (Currently amended) The process according to ~~any of claims 1 to 11~~ claim 1, which is carried out continuously.

13. (New) The process according to claim 2, wherein the process sequence begins with process step (d) in the first run so that fresh Lewis acid and fresh nickel(0) catalyst and/or reductively regenerated nickel (0) catalyst are used.

14. (New) The process according to claim 2, wherein 3-pentenitrile hydrocyanated in process step (d) comes from the hydrocyanation stream 1 and isomerization stream 1.

15. (New) The process according to claim 2, wherein only a portion of the catalyst stream 2 is used for the hydrocyanation in process step (d) and the remaining portion of the catalyst stream 2 is transferred directly into process step (e).

16. (New) The process according to claim 3, wherein only a portion of the catalyst stream 2 is used for the hydrocyanation in process step (d) and the remaining portion of the catalyst stream 2 is transferred directly into process step (e).